

PEST TECHNOLOGY

Pest Control and Pesticides

Technical Editor - A. K. Palmer, B.Sc.

A RHODES PUBLICATION

Vol. 2. No. 7

April, 1960

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Published by:

Rhodes Industrial Services Limited,

Four Avery Row, Grosvenor Street,

London, W.1.

MAYfair 4265

Malaria concerns us all

THIS YEAR World Health Day will be held on 7th of April and throughout the month the World Health Organisation will be receiving publicity from the technical and daily press that it so richly deserves.

Once again the eradication of malaria is the main theme and the impressive progress which had been made in this direction is largely due to the efforts of the World Health Organisation, to the discovery of modern insecticides and anti-malarial drugs. It is not so long ago that malaria was the most economically important disease to man with regard to death and sickness caused and work hours lost. Now it probably ranks behind bilharzia and trypanosomiasis as the third most important parasitological disease of man, although there are some differences of opinion in this matter.

However, it was realised five years ago by the World Health Organisation that malaria is still a great threat and, unless it can be wiped out completely, the tremendous efforts already made would be wasted and malaria would regain its place as the scourge of mankind. The development of insecticide resistance showed that the anopheline vectors could not be eradicated and so the W.H.O. turned their attention towards eliminating the malarial parasite. The basic idea is simple, an area is taken, preferably one which can be geographically isolated (in this respect it is interesting to note that many of the areas from which malaria has been eradicated are geographically isolated, i.e. islands) then, by an intensive campaign, the number of vectors is reduced and maintained at a level which will prevent parasite transmission. In this period the doctors will carry out their side of the work and, by the administration of drugs, eradicate the parasite from the human population. After it has been eradicated the intensive campaign against the mosquito can be relaxed to a great extent, providing that they are not also the vectors of some other disease.

Unfortunately, it is not that simple, it is true that we have the anti-malarial drugs, it is also true that we have a sufficient variety of residual insecticides which, despite the fact that insecticide resistance may develop, would keep the vectors down to the necessary level for the period of time—say 3-4 years—needed to eradicate the parasite from the human population. However, there are also great difficulties to be overcome, mainly concerned with administration and organisation.

Before an eradication campaign can begin a thorough investigation of the area must be made for each area will have its own individual problems and the strategy must be varied accordingly. Consider first the case of controlling the vector. First of all the anophelene(s) concerned must be determined and its habits studied so that its breeding sites will be known as will be the situations in which it will be most liable to come into contact with man. This in most cases is already known and the great difficulty is organising the campaign to ensure that every breeding site and man/mosquito contact area is made objectionable to the mosquito by whatever means possible. It must be carried out with military precision and, like any military campaign, it requires economic resources.

Now consider the treatment with anti-malarial drugs. We have said that the parasite must be completely eradicated, again there are tremendous administrative difficulties in ensuring that everyone is treated, especially in backward countries where transportation is poor and human settlements are remote; social prejudices and lack of education may have to be overcome and the cost of supplying drugs and employing doctors would be enormous.

What is needed therefore, is not so much scientists and research workers, but cash to develop these malarious countries—cash to raise the standard of living—cash to educate them and cash to pay for the drugs, insecticides, doctors, administrators, etc.

The countries suffering from malaria have not the capital to develop their natural resources, and they must receive it from the better developed countries, if they don't, then it is not only they who will suffer, but the whole world. True, malaria may not ravage countries such as Britain, and the United States, but our trade would be affected to such an extent that our standard of living would decline.

Malaria, filariasis, sleeping sickness, plague, schistosomiasis and other diseases are the concern of everyone.

THE CONTROL OF FRUIT PESTS

No. 1 — GUSATHION AND ITS USES

Miss K. M. POWELL, B.Sc. (*Baywood Chemicals Ltd.*)

GUSATHION, or Guthion as it is called in the U.S.A. is another addition to the line of organophosphorus insecticides, developed by Farbenfabriken Bayer of Western Germany. Gusathion has been successfully used on a commercial scale in many continental countries, the United States and the Dominions for several seasons. It is claimed to control a wider range of pests than any other present day insecticide and following two years of trials it is said to be just as efficient under British conditions. The following account is based on these trials.

Introduction

GUSATHION is an organophosphorus compound with the chemical name of *S*-(3,4-dihydro-4-oxobenzo-(1,2,3)triazin-3-yl)methyl 0,0-dimethyl phosphorothiolothionate and is formulated as a 20% w/w emulsifiable concentrate. It kills either by contact or as a stomach poison. Although it is non-systemic it does have some penetrating action through the plant cuticle and is, therefore, able to reach insects with which it does not come into direct contact at the time of spraying. It is effective for about 10 days after application, depending on weather conditions, but in most cases a considerably longer period will elapse before a pest such as Red Spider re-establishes itself.

Toxic Hazards

As the material is non-systemic the risk of harmful residues in the fruit is reduced.

Although it falls into the second schedule of the Agricultural (Poisonous Substances) Regulations and, therefore, protective clothing is necessary during application, Gusathion is less toxic than Parathion and in comparison with this material, safer to handle. This is due partly to the lower vapour pressure of Gusathion and

partly to its low skin toxicity which is in the region of 400 mg./kg.

Like other organophosphorus compounds, Gusathion is a choline esterase inhibitor but since it is a methyl compound the action is rapidly reversible. It does not act as a cumulative poison because it is rapidly broken down into harmless components within the body and excreted.

One of the advantages of the organophosphorus group of insecticides is due to the fact that most of them are broken down within a comparatively short time and do not persist in the soil or plant or animal tissues. This is in contrast to the chlorinated hydrocarbons which although of a lower acute toxicity persist in the soil and in animal tissues, and may therefore be more of a potential danger than is generally realised.

Recommended Use and Pests Controlled

At present, Gusathion may only be recommended for use on apples and pears. On apples, 5 applications per season may be used, on pears 3 applications. A period of three weeks must elapse between the last spray and harvesting the fruit.

Its most important use on the above crops is for the control of Codling Moth. This pest is becoming more and more of a problem in this country on account of the tendency to hatch earlier in the season and to carry on laying eggs much later than in the past. Under favourable conditions a second generation may be produced. In addition, there is a danger that DDT resistance may develop as it has in the United States and elsewhere.

Gusathion has proved particularly effective against Codling Moth as it kills the caterpillars up to 3 days after they have entered the fruits and, in addition, kills the eggs. Two applications only, are necessary, the first towards the end of June followed by a second about 3 weeks later. As with other materials timing is very important if the maximum degree of control is to be obtained. Where possible, observations on the flights of the female moths should determine when to spray. Since oviposition is limited to warm summer evenings this should not be too difficult even without the aid of a light trap.

The application of Gusathion will, at the same time, give an excellent control of Tortrix Moth caterpillars. Although the so-called Summer Tortricids have been known to attack fruit trees for some time, it is only during the last few years that they have become important as pests. Owing to their habit of feeding between two leaves, or more important, on the surface of the fruits, under a leaf, the caterpillars are protected to a large extent against most insecticides.

The two most important species are the Summer Fruit Tortrix *Adoxophyes orana* and the Surface Eating Tortrix *Cocoecia oporana*. The two are quite easy to distinguish by the type of damage they cause. The Summer Fruit Tortrix eats large areas of the fruit surface and the cavity made may be quite deep, whereas the Surface Eating Tortrix eats much smaller areas and causes a more superficial type of damage. The latter appears to be the



Left. Soft Scale (*Coccus hesperidum*) on Citrus leaf
Right. Adult Mealy Bug (*Pseudococcus citri*)

more difficult to control with conventional sprays such as DDT, but both species are effectively controlled by Gusathion in the egg and the caterpillar stage.

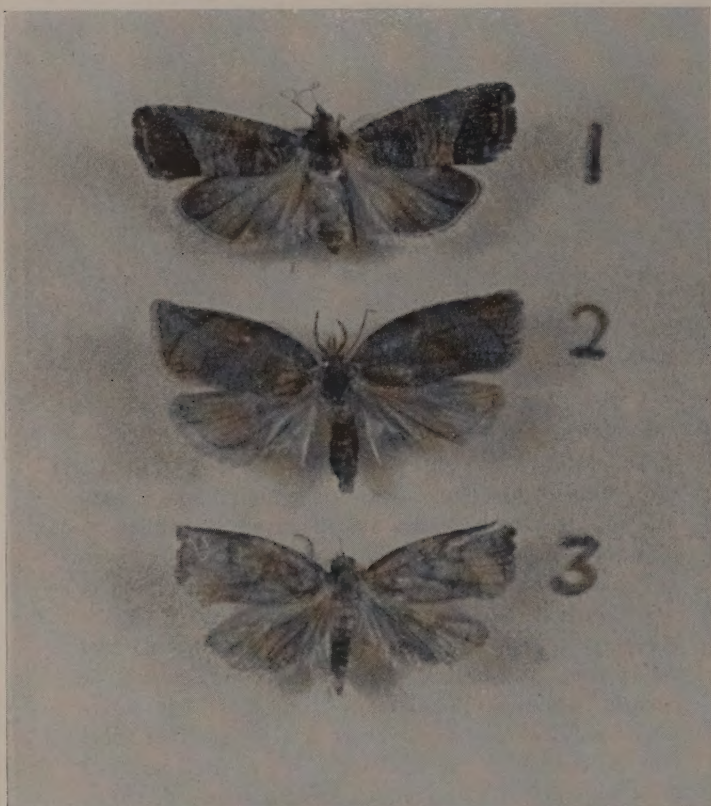
The routine sprays against Codling will usually control any Tortricids present, but in some seasons it may be necessary to apply a third spray to kill late hatched caterpillars, particularly where a second generation occurs. Although the damage from these late caterpillars may be only slight, there is a danger that some may be carried to the packhouse where they continue their activities and may attack large numbers of fruits. It is thus important to obtain as complete a control as possible.

In addition to controlling Codling and Tortrix moths, Gusathion will keep an effective check on Red Spider, (*Metatetranychus ulmi*) and Bryobia mite (*Bryobia praetiosa*). The Bryobia mite, normally associated with gooseberries but also found on many other plant species, has become an important pest on apples in some areas of the country. It varies in colour from yellowish-green to bright red and may be distinguished from the Fruit Tree Red Spider by its larger size and its long pair of

Fully grown caterpillar
of *Cocoecia oporana*
ready to pupate.



Photo—
Baywood Chemicals.



1. *Codling Moth*
2. *Summer Fruit Tortrix* (*Adoxophyes orana*)
3. *Surface Eating Tortrix* (*Cocoecea oporana*)

front legs. The petal-fall application of an acaricide will usually keep the mite population at a low level for some time, but towards the end of June there is a tendency for it to build up very rapidly. By applying Gusathion against Codling at this time a very effective control of Red Spider mites will be obtained, and any subsequent sprays will keep the mite population at a low level until the end of the season. Gusathion has also shown itself to be effective against spider mites resistant to other materials.

Tables I, II and III show some results of trials carried out in the United Kingdom on the above pests. In each case the trial was fully randomised and replicated. The rate of Gusathion used was $1\frac{1}{2}$ pints per 100 gallons of water, applied at 200 gallons per acre (high volume). DDT was used at the rate of 10 pints of 15% DDT per 200 gallons of water, per acre.

Gusathion has also shown promising results against a number of other pests on top fruit including the Apple Aphids, Winter Moth caterpillars, Apple Blossom weevil and Apple and Pear sucker. It may, therefore, be safely recommended for pre-blossom use on these pests. There are indications that it will also give satisfactory control of Sawflies at both the larval and egg stages.

TABLE I
Codling Moth

Spraying Dates	Varieties	Blemishes per 1000 apples at harvest		
		Gusathion	DDT	Control
1st July	Cox's Orange Pippin and Laxton's Superb	8	32	70
23rd July				

Note: The poor results shown by DDT on codling probably partly due to the late application of the spray, indicating that timing of application is more critical with DDT than with Gusathion.

TABLE II
Surface Eating Tortrix (*Cocoecea oporana*)

Spraying Dates	Varieties	Blemishes per 1000 apples at harvest		
		Gusathion	DDT	Control
1st July	Cox's Orange Pippin and Laxton's Superb	6	52	116
23rd July				

TABLE III
Red Spider Mite

Spraying Dates	Sampling Dates	Varieties	Mites per 30 leaves	
			Gusathion	Control
28th May	4th Jun.	Cox's	0.6	241
	18th Jun.	Orange Pippin and	7.0	301
22nd June	25th Jun.	Worcester	0.3	558
	16th Jun.	Pearmain	0.3	344
20th July	23rd Jul.		0	984
	4th Sep.		10	1,489

The recommended rate of use for Gusathion is $1\frac{1}{2}$ pints per 100 gallons high volume or 3 pints per acre low volume for the control of all the pests mentioned.

It is compatible with most of the fungicides including Colloidal Sulphur, Captan, Thiram, Zineb, Ferbam and with DDT, but its use with Lime Sulphur is not recommended.

Future Possibilities

Gusathion has been tested on a wide range of crops including many fruit varieties, hops, cereals, brassicas, legumes, and ornamentals, without any damage occurring. This, together with its effectiveness against a large number of pest species, indicates that Gusathion may well play an important part in the various fields of horticultural and agricultural pest control in the future.

Its use could well be extended to fruit crops other than apples and pears for the control of aphids, spider mites, caterpillars, sawflies and other pests. It has not, however, given good results against Big Bud mite of blackcurrants or Strawberry mite.

On arable crops, tests have shown a good control of the following pests:

<i>Plutella maculipennis</i>	—Diamond-back Moth
<i>Pieris brassicae</i> and <i>P. rapae</i>	—Cabbage White Butterflies
<i>Leptinotarsa decemlineata</i>	—Colorado Beetle
<i>Meligethes</i> spp.	—Blossom Beetles
<i>Thrips tabaci</i>	—Onion Thrips
<i>Aphis</i> spp.	—Aphids.

Gusathion is particularly promising in the glass house and ornamentals field as it has given good results against a number of pests which are normally difficult to control. These include the Soft Scale *Coccus hesperidum*, the Oleander Scale *Aspidiotus hederae*, the Holly Scale *Diaspidiotus brittanicus*, Mealy Bugs *Pseudococcus* spp. and a number of other species.

In addition, it is very effective against Glasshouse Red Spider mite *Tetranychus telarius* and in trials carried out in Holland was the only organophosphorus compound which gave a reasonable control of resistant mites.

All the species of aphids found in glasshouses and on ornamentals are, of course, controlled as well.

A further group of pests, the thrips, have been shown to be effectively controlled by Gusathion, including the Glasshouse Thrips *Heliothrips haemorrhoidalis* and Flower Thrips *Frankliniella* spp.

These are not by any means the only possibilities for the use of Gusathion and further trials are constantly being carried out with a view to widening its sphere of use.

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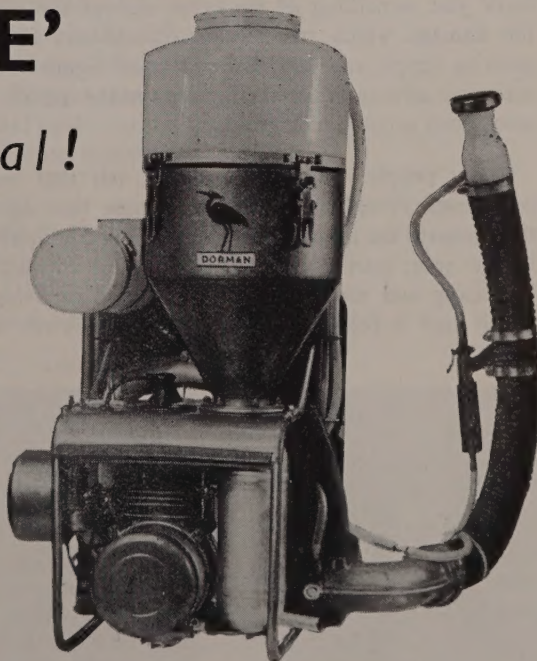
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A.B.M.A.C. Evidence

Refutes Pesticide Criticisms

ON the 15th March, the Association of British Manufacturers of Agricultural Chemicals held their first major press conference. Giving the reason for this step, Mr. G. Huckle, Chairman of ABMAC said:

"During the past few months there has been much misunderstanding regarding the use of crop protection chemicals and we have therefore invited you today to show you something of the other side of the picture; the damage which insects and disease can cause to growing crops and to give you some figures on the economic advantages to the farmer and the nation, from using crop protection chemicals."

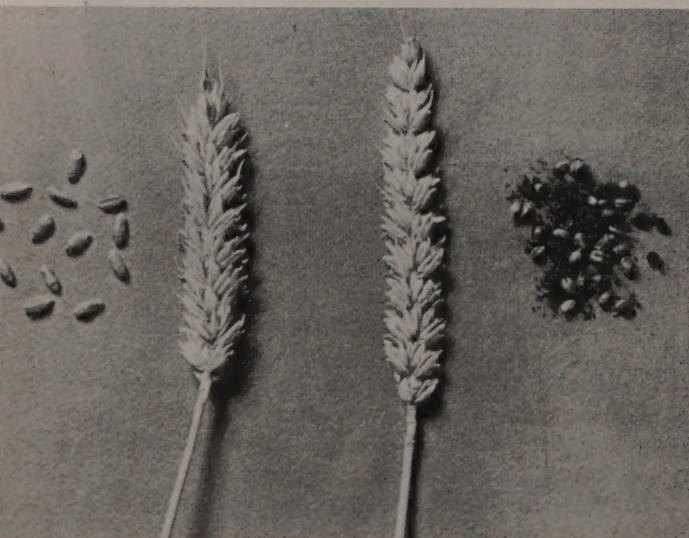
Many people, ourselves included, felt that such a conference should have been held some time ago and that hitherto the industry has not given enough publicity to the great part played by agricultural chemicals in increasing and maintaining our standard of living. It is felt that a conference, or conferences, given at an

earlier date may have prevented or at least toned down the recent vicious attacks levelled at the manufacturers and users of pesticides. However, the past is past and we cannot alter that. We were pleased to note that ABMAC regained a lot of lost ground by giving a first rate conference and by presenting, in emphatic style, the overwhelming evidence in favour of the continued use of chemicals in agriculture.

Despite the fact that a great deal more evidence could have been brought to bear, the data presented in the opening accounts by Mr. Huckle, (Shell Chemical Company), Mr. Billet (Boots Pure Drug Company) and Dr. Holmes (Plant Protection Limited) appeared sufficient to answer many of the questions before they arose. Consequently, the questions which did crop up at question time were, in general, expected and the panel which included Mr. H. C. Mellor, Vice-Chairman of ABMAC, (Plant Protection Limited), Mr. N. K. Smith (Murphy Chemical Company Limited), Dr. E. F. Edson (Fisons Pest Control Limited) and Mr. W. A. Williams, Secretary of ABMAC, in addition to the three speakers aforementioned, had no difficulty in supplying the answers.

Lest anyone should forget the figures quoted by the speakers, a pamphlet had been prepared providing some information on the use of chemicals on the land and giving facts and figures on the amount of crops which had been preserved through the use of chemicals. After quoting the impressive fact that one pair of houseflies can produce 191,010,000,000,000,000,000 offspring between April and August, sufficient to cover the earth to a depth of 47 feet if all of them survived, the pamphlet went on to give examples, describing the less spectacular but equally important use of chemicals in such crops as sugar beet, peas, potatoes, cereals and apples.

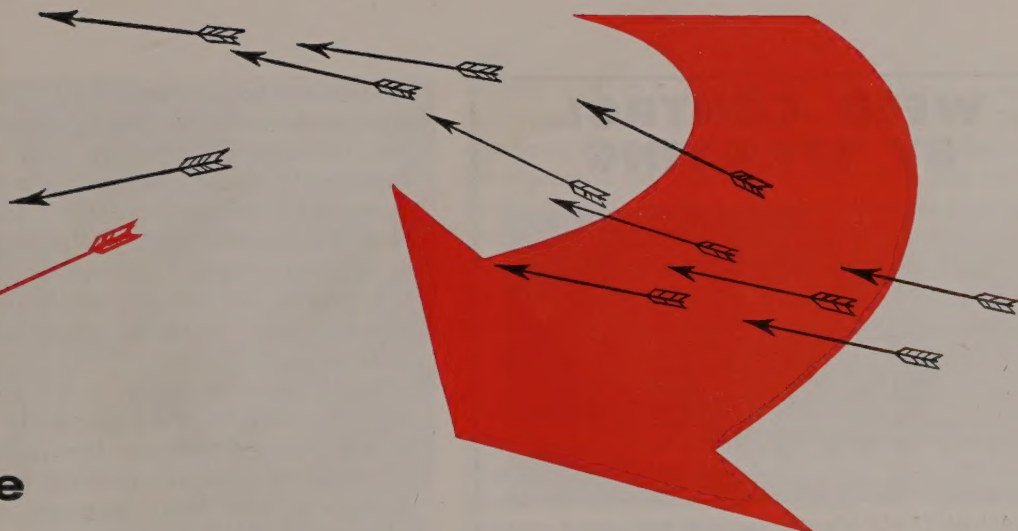
It may be that some of our readers are aware of the facts and figures given at the conference but it is equally certain that many are not and in any case, the following data are worth repetition. Mr. Huckle set the ball



Bunt of Wheat.

A healthy head and grains (left) compared with bunted head and grains.

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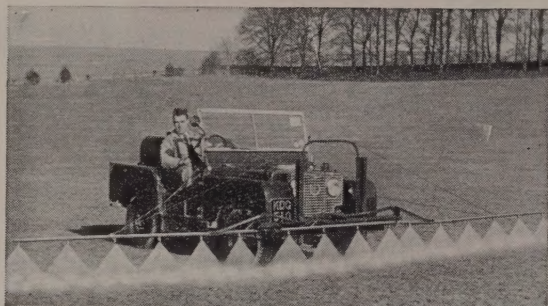
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rolling by pointing out that ABMAC is the representative body in the U.K. of the manufacturers of crop protection chemicals and that it exists for the discussion of problems of mutual interest, for improvement in crop protection, production and liaison on technical progress in the control of pests, diseases and weeds. He emphasised, as so many members have done, that ABMAC believes that good husbandry takes the first place in the formation of healthy crops but added that current evidence shows chemical aids to be indispensable to modern farming and in this age crops cannot be produced economically without them.

To those imagining that losses due to pests are solely the result of modern farming methods, Mr. Huckle referred to the Bible which gives some dramatic accounts of wasted fields and lost harvests; to the bubonic plague and to the more 'recent' great potato famine—caused by blight—in Ireland.*

On the safety and related aspects of pesticide production, Mr. Huckle said:

"Many of you here will already know something of the many and costly steps which precede the production of new chemicals. It has been estimated that only about one in every 3,000 chemicals tested can be expected to be likely to provide a potential new material. The

* We would also refer them to George Ordish's brief but excellent article 'Agricultural Pests in History', *Span*, 3, (1), 22-6.

production of new chemicals involves elaborate screening, experimental laboratory and glasshouse tests, field trials and, not least, toxicity tests. In a world where the population is increasing at the rate of one mouth every second and where land is being lost through soil erosion alone at the rate of 10,000 acres per day, the part played by technical research is tremendous. It is doubtful, in fact, whether any industry spends so much time and money on its research programme in relationship to turnover.

"In this country nowadays no crop protection chemical which would be harmful to human beings, is marketed until its toxic properties have been carefully examined by a Scientific Committee appointed by the Ministry of Agriculture, and, where necessary, recommendations issued for its safe use. Elaborate machinery exists for the provision to the Ministry Committee of all the relevant data on the toxic properties of new crop protection chemicals.

"This arrangement was sponsored by this Association and since it came into operation there is no case on record where the recommendations of the Ministry have not been 100% accepted. This work is additional to the research which has to be carried out to determine the biological efficiency of a new chemical. It has been estimated that it takes from three to five years to produce a new crop protection chemical and the cost may be anything from a quarter million pounds to one million pounds."

Mr. Huckle further stated that the Association welcomed the formation of the Study Group, set up by the Ministry of Agriculture (see *Pest Technology* 2, (6), 129) to study the need for further research into the effects of the use of toxic chemicals in agriculture and to make recommendations, and felt sure that the findings of the group will remove much of the existing prejudice against the use of crop protection chemicals. Finally he pointed out that:

1. By the year 2,000, a mere 40 years from now, world population will have risen from 3,000 million to over 6,000 million. Obviously world food production figures must rise at least at the same rate if we are not to be faced with mass starvation. Husbandry alone cannot possibly solve this problem. The use of chemicals is vital.
2. Some reference is made occasionally to "indiscriminate use of chemicals". I think it would be fair comment to say that no farmer today makes "indiscriminate use" of any material, chemicals, fertilisers, seed, machinery or anything else. He simply cannot afford to do so and there is no point in it anyway.
3. On a more tragic and topical note I should like to remind you of the part being played by DDT in Agadir at this very moment. Many tons of this insecticide have been flown into the country and

Continued page 143.



Apple scab, attacks leaves, shoots and fruits.

used, and without this and the other chemicals being used, disease would have been rampant.

4. No one knows exactly what would happen if the use of crop protection chemicals on the farm should be abandoned but it is quite safe to say that we could not possibly commercially produce many of the crops we grow today and the yields of many others would be drastically reduced. You just cannot raise crops without these chemicals and expect even reasonably to maintain the standard of living we enjoy today.

Mr. Billet followed the Chairman by reviewing the economics of the use of weedkillers. Brief points from the account being that, the vast majority of weedkillers used in this country are of the selective growth regulator type, i.e., MCPA, 2,4-D, etc., which were developed by British research. Indeed at question time, when the panel were pressed to give figures, it was estimated that 60-70% of the fungicides, herbicides and insecticides, used in the U.K. today, were of the selective growth regulator type.

Since the development of these weedkillers progress has been rapid and at present it is estimated that 83% of farmers, farming over a hundred acres, spray 75% of their cereal crops with selective weedkillers. Last year spraying contractors alone sprayed over 7,000,000 acres of cereals, this being split up as follows. 2,000,000 acres of wheat, 2,000,000 acres of oats and 3,000,000 acres of barley. The advantages of using weedkillers include increased yield, i.e. figures from field trials of 1958-59

indicate a 20-25% increase in yield—this is a direct advantage. Other advantages include the facts that—it is easier to use a combine and other mechanical aids, the absence of weeds reduces the risk of lodging and an improved seed sample is obtained, therefore less weeds will be produced in the following year. It must also be remembered that the presence of weed seeds in grain may lead to a higher moisture content and associated disadvantages and that easier use of mechanical aids leads to speedier harvesting—an important advantage in our climate—and frees labour for other tasks.

It must be realised that with the present labour shortage and the present high cost of labour it would be impossible to go back to hand hoeing. Yet it would be equally difficult to use mechanical aids successfully, without the use of chemicals.

Quoting from Miss P. M. Hillebrandt's paper "The economics of the use of pesticides in agriculture with special reference to weedkillers on wheat in the South-eastern half of England", it was stated that the benefit to a farmer from using pesticides would be in the region of 75/- per acre from the direct advantages such as increase in yield, and a further 75/- per acre from indirect advantages such as a cleaner seed and speedier harvesting.

Although the references made by Mr. Billet refer mainly to the use of MCPA and the like in cereal crops, it must be pointed out that significant, if not so spectacular results can be obtained from the use of weedkillers in other crops—sugar beet, for example.

In discussing the economics of the use of fungicides, Dr. Holmes stated that they were used for two purposes, (a) for the improvement of quality such as the use of foliar sprays to prevent scab, and (b) for an increase in quality, e.g., spraying against blight.

Dr. Holmes made several references to the pamphlet issued by ABMAC at the meeting and regarding the former purpose of fungicides we quote the following comment concerning the control of apple scab on Cox's Orange Pippin.

"The housewife, however, is prepared to pay for good produce and this enables the grower to spend up to £25-40 per acre on protective sprays alone to produce first class fruit which, because a higher proportion of the crop is top grade, is worth up to 30/- per bushel, more than an unsprayed crop. At a production rate of 250-350 the increased value of a sprayed crop may well be £450-600 per acre."

Regarding the use of fungicides to increase the quality of crop it was pointed out that it has been estimated that in England and Wales 350,000 tons/annum or 18½ lb. per person per annum of potatoes would be lost through disease unless spraying was carried out where and when required. Of a total area of potatoes in England and Wales of roughly 571,000 acres, 341,000 acres are sprayed, mainly with copper products.



A frequent but unwelcome sight. Large cabbage white butterfly larvae and damage.

The previous examples are of course foliage application seed dressing the other major form of application is also used for the improvement of quality i.e., control of bunt of wheat and increase in quantity i.e., control of leaf stripe of oats. Examples of the benefit to be obtained from the use of such dressings are numerous and well known.

As to the safety of the fungicides Dr. Holmes pointed out that, although mercury compounds are dangerous, the technique by which they are applied makes them safe and to his knowledge the worst that had occurred was 1 or 2 cases of dermatitis in 3 or 4 years of use.

In conjunction with the rest of the panel he criticised that section of the community who put the blame for any untoward and undesired event that arose on scientific



Seed dressing treatment for the control of wireworm and seed-borne diseases. On the left-hand side untreated barley seed has been sown, with resulting wireworm attack. On the right-hand side, dressed barley is free from attack, and is growing away well.

advances. As an example of this non-objective reasoning, he told of a certain land-owner who complained that a whole pack of hounds had died as a result of running through a field in which mercury treated seed had been sown. Upon investigation it was decided that if the hounds had eaten everything in the whole field they still would not have consumed enough mercury to kill half a hound never mind a whole pack. The cause of death was eventually found to be anthrax.

The final speech from the platform came from Mr. N. K. Smith who gave an account of the economic benefits to be obtained from the use of insecticides.

Every cultivated crop suffers from insect pests and there are masses of figures available to show the untold damage that they can cause. For example in the U.S.A. the total loss taken over a 10 year average from pests and diseases were between 10-15% of the total crop and represents a loss of 22 million. In Holland there was a 10% loss and in Germany the loss ranged from 5-25%, an average of 15%, which in terms of hard cash represents 2 million Reich Marks. Regarding the United Kingdom, the loss is in the order of 10% representing £88 million (this figure caused some confusion amongst several members of the audience as Mr. Huckle had quoted a figure of £140 million. However, it was explained that the figure of £140 million was the estimate given by George Ordish in his book "The Untaken Harvest" published in 1947 and represented losses from pests, diseases (roughly £77 million) and weeds (roughly £70 million). The fact that the losses from pests and diseases alone is now equal to £88, as opposed to Ordish's estimate of £77 million, is due to higher costs which would be even higher without the use of pesticides). A recent estimate by the United Nations showed that storage loss of wheat throughout the world, was in the region of 33 million tons per year.

Mr. Smith added that we can now check these losses to a remarkable degree and as an example stated that within five years of the introduction of DDT into this country there was a 160% increase in potato yield, and an increase in onion yield 140%. Other crops showed a similar increase.

Of course some credit for this is due to the greater use of fertilizers and machines but this brings about a steady increase in yield whereas the use of pesticides, in those crops on which they can be used, can bring about a fantastic increase of food production.

It must also be remembered that many of the insecticides used in agriculture are also used in the field of Public Health. The use of DDT for example, is estimated to prevent 5 million deaths and 100 million sicknesses per year from malaria alone.

Mr. Smith ended on a sombre note by pointing out that two thirds of the population in the East were already on the verge of starvation, this fact considered with the

DRY ROT OR WOODWORM

rapid increase in world population means that we must provide a larger increase in food production than the world had ever known.

Mr. Huckle further emphasised this point by referring to the figures given in his talk and by stating that if present trends continue then, within 7 years India would be facing mass starvation. He warned us that we (which includes the U.K., U.S.A. and the rest of the Western world) cannot afford to be insular in this matter, for over population and mass starvation in the East would undoubtedly cause severe repercussions throughout the rest of the world.

In the discussion that followed the questions were, as expected mainly concerned with the toxic effects of modern pesticides on man, wild life and beneficial insects and the main points to come out of the discussion were:—

1. Less than 3-5% of the chemicals used were scheduled poisons. 60-70% of the chemicals used are selective weedkillers which are non-poisonous to animals. The rest are relatively non-toxic compounds such as copper sprays.
2. The deaths of game and other birds resulting from the use of pesticides (regrettably there are one or two) *are insignificant in relation to the deaths from natural causes.* Moreover the number of birds poisoned by insecticides are also insignificant to the number dying of 'lead' poisoning on the first day of the shooting season.
3. The selective weedkillers are, as far as is known, inactive against invertebrates. Unfortunately many of the present day insecticides are lethal to beneficial as well as harmful insects but the industry is aware of this and the vast majority of research is directed towards producing more selective insecticides non-toxic to beneficial insects. In order to prevent large scale loss last summer, farmers had to spray crops in flower, this unfortunately resulted in the death of a large number of bees. Following this representatives of ABMAC, the NFU and the Beekeepers' Association discussed the situation and there is now to be a system of warning for beekeepers. Farmers and spraying contractors have been urged to co-operate with the beekeepers.
4. There is no evidence that residual insecticides will reduce the population of micro-organisms in the soil, even though they may be used for years. It must be remembered that the majority of modern insecticides are organic and they will be rapidly broken down in the soil. Indeed with many of them subsequent applications will be broken down more rapidly due to the multiplication of micro-organisms as a result of the first application.

A final point which arose from the discussion was the fact that ABMAC in conjunction with the Ministry of Agriculture are planning to introduce a more efficient Crop Protection Products Approval Scheme.



Act now, before extensive and costly damage occurs—but don't take risks with unskilled diagnosis and inadequate treatment. Get in touch with the Cuprinol Preservation Centre which is backed by *nearly 50 years experience.* Their network of Authorised Cuprinol Servicing Companies covers the whole country. They will survey, submit a report and estimate on any outbreak, and are fully qualified to carry out expert treatment economically.

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Pest Technology, April, 1960—145

Potato Eelworm Control

Following 20 years of research into the control of soilborne diseases, especially the potato eelworm, Dr. John Grainger, of the West of Scotland Agricultural College, Auchincruive, Ayr, Scotland, has now reached a point where he can achieve an 85% reduction in potato root eelworm and an increase in yield from 7 tons per acre to 11 tons per acre. Dr. Grainger believes that, unless eliminated, the potato eelworm will overrun the potato growing areas of Western Europe within 40 years.

Extensive pot experiments with various compounds of mercury showed that they would control potato root eelworm and other diseases at the low rate of about 5 lb. mercury equivalent per acre. It was, however, essential to incorporate the mercury compound with something like 12 bushels of diluent dust and mix it very thoroughly with the soil. So promising did the method seem that it became necessary to produce a field-scale machine to do the mixing.

In the experiments a radioactive isotope, iodine 131, was used in place of the mercury to simulate good and bad mixing and made possible a quantitative specification of adequate incorporation. It also selected the rotary cultivator as the best practical mixing device and showed that two placings of the material to be added were necessary for a uniform distribution to a depth of 9 in. Placings at the surface and at a depth of 7 in. deep were found most suitable. Applications in depth were mechanised by blowing the dust into the spaces behind duck-foot tines and problems of the tractor-scale supply of dust were solved by work on trial machines.

Most of the work has been on the control of potato root eelworm (*Heterodera rostochiensis*), but it has also been found that the amounts of the soil fungi *Rhizoctonia* and *Colletotrichum* attacking the potato roots were also reduced, the former by 73% and the latter by 44%. Perhaps most important of all the other features of the compound has been its ability to reduce the amount of club root, *Plasmodiophora brassicae*, on susceptible swedes from 42% on untreated crops to less than 1%



The machine concerned in the trials is the 30" Howard-Allman Soil Mixer. Trial plots were selected by local N.A.A.S. Entomologists in the following counties: Norfolk, Lincs., Lancs., and Yorks. These experiments were laid down under the guidance of Dr. J. Grainger, Ph.D., B.Sc., Application of Yellow Oxide of Mercury was at two levels, surface and 7 inches. All plots selected were approaching the dangerous level of eelworm infestation but none exceeding 1.2 cysts per gram of soil. Photo—Rotary Hoes Ltd.

on treated ground on which there were, moreover, increases in yield of about 68%.

In the pot experiments, mercuric oxide or yellow oxide of mercury (Y.O.M.) was found to be the best material for making into a dust. Though insoluble, it is in a fine state of division, having a basic particle diameter of less than 1μ . It was produced for these investigations by F. W. Berk & Co. Ltd., of London, using Filler G.A. as the diluent. This has a mean particle diameter of 9μ —sufficiently small to distribute evenly in small particles of Y.O.M., but friable enough to work well in a dusting machine.

The dust prepared has the following characteristics: type, diatomaceous; particle size, 1 to 27μ ; mean 9μ 99% through 200 mesh; angle of repose, 40 deg. undisturbed, 35 deg. when shaken; weight per cu. ft., 65 lb. fluffed, $77\frac{1}{2}$ lb. compacted; percentage by weight of mercury, 0.54.

This dust is one of the heaviest used in practice and was chosen deliberately because it was originally intended to investigate the use of fertilizer mixtures as carriers of the mercury, in order to keep down costs. Should the use of fertilizers prove impracticable (as now seems likely) the use of a lighter dust would provide another way of cheapening the cost of application. A survey is

in progress to find the least expensive diluent dust, for it is thought that this line of approach might be better, in practice, than using ground fertilizer. Farmers use widely differing rates of fertilizer per acre, so that a multiplicity of formulations would have to be available. Modern trends, moreover, are all toward granular manures which are too coarse to be used as carriers for the intimate mixing involved in the control of soil disease. There are also difficulties with hygroscopic constituents and grinding the fertilizer would involve some cost.

Dr. Grainger has spent much time experimenting with various types of agricultural equipment for distributing the dust mixture and was finally led to selecting the Howard Rotavator, made by Rotary Hoes Ltd., West Horndon, Essex, which was the only implement that gave him the high standard of mix required. In the prototype machine was incorporated a "Speedisi" duster developed by E. Allman & Co. Ltd., which comprised a hopper, booster gun and a series of polythene tubes which convey the Y.O.M. to the duck-foot tines and to baffle plates just in front of the Rotavator unit. In operation, therefore, one gets a surface application and an application of a depth of 7 in. The Rotavator then mixes the Y.O.M. with the sod to a depth of 9 inches.

During the past six years various experimental plots have been selected for treatment, each having widely differing soil conditions, and further experiments are now being carried out with the help of local N.A.A.S. entomologists in different parts of the country, using a 30 in. Howard-Allman Auchincruive Soil Mixer and a rate of application of 5 lb. Y.O.M. in 9 cwt. of Fullers Earth. All the plots selected were approaching a dangerous level of eelworm infestation, but none exceeded 1.2 cysts per gram of soil.

In recognition of his work in this field Dr. Grainger was awarded the Silver Medal of the Royal Agricultural Society at the Royal Show last summer, when a prototype of the spreading machine was displayed.

Boots Cut Weedkiller Prices

Price reductions of up to 20% in weedkillers manufactured by Boots Pure Drug Co. Ltd., and on sale in the branches of the company's Farms and Gardens departments are announced today.

The cuts, which are due to lower costs, are for Lornox Plus Selective Weedkiller, Lornox Selective Weedkiller, and Dalapon Weedkiller. The 4 fluid ounce bottle of Lornox Plus Selective Weedkiller is reduced from 5/- to 4/-; 20 fluid ounce bottle of Lornox Selective Weedkiller from 9/- to 7/6; and 5 lb. tin of Dalapon Weedkiller from 62/6 to 58/9.

These reductions come into immediate effect, and bring the total of over-the-counter products of their own manufacture to be reduced in price by Boots during the past 17 months to almost 70. These products include antifreeze, olive oil and vegetable oil, and a range of medicinal, culinary, toilet and other agricultural preparations.

Rat Poison in Consumer Packs

A new development in packaging for the ultimate consumer (!) is the introduction of individual sachets of rat-poison, each containing a single heavy dose, by A.C.F. and Shirley's Fertilisers, of Brisbane, Australia.

The sachets are made from a Lustralac glassine material, supplied and printed by The Robinson Waxed Paper Co. Ltd. (Fishponds, Bristol), which allows the odour of the bait to penetrate, yet prevents the ingress of water. The sachets are strewn in

likely places where the escaping odour is scented by the rat, who bites through the pack and eats the poison.

It is claimed that only a very small quantity of poison is left by the rat, so that domestic animals are protected and cleaning up is restricted to simply removing unopened sachets.

The sachet material is transparent, and is printed in reverse on the inside with the word "Poison" in large red capitals. It is supplied by RWP in reel form for fabrication and heat sealing on automatic machines.

At present these sachets are only available in Australasia.

Five-Hundredth Rabbit Clearance Society

On the 15th March, 1960, the Rt. Hon. John Hare, O.B.E., M.P., the Minister of Agriculture, Fisheries and Food, congratulated Mr. A. H. Adey, the Chairman of the Amersham and District Rabbit Clearance Society, and Mr. Graham Swerling, the Secretary, on the distinction of being the 500th Society to be registered in Great Britain. Mr. F. J. Holman, Chairman of the Federation of Rabbit Clearance Societies, representing societies which are already in the field, and Mr. D. G. Bailey of the Agricultural Central Co-operative Society and Secretary of the Federation of Rabbit Clearance Societies, were also present.

In congratulating the Society the Minister said that the formation of 500 societies in just under two years is a magnificent achievement, which reflects very great credit on those whose enthusiasm and activity has contributed towards the formation of these societies. He said, however, that there is still a good deal of country which has yet to be covered, and he hoped that the achievement of the 500 mark would encourage those who are not yet in the movement to lose no time in getting together and forming societies so that their lands are not laid open to re-infestation by rabbits.

Mr. Adey and Mr. Swerling are active farmers in Buckinghamshire and have long been 'anti-rabbit' men. It is largely through their activities that the Society has been brought into being. Buckinghamshire, like most parts of the country, has a fair sprinkling of rabbits which could rapidly become a menace if left uncontrolled. Although there are already five other societies in the county, the greater part has still to be

covered, so the Amersham Society is a welcome addition to the anti-rabbit forces as it covers about 5,000 acres of agricultural and woodland on the northern side of the main London to Oxford road. The land is part of the green belt.

Amongst its 35 members who pay 1/- an acre are the Buckinghamshire County Council and the Forestry Commission. In the centre of the area is Coleshill Common, on which the Ministry of Agriculture is dealing with the rabbits.

The Society's first objective is the destruction of rabbits, but it will also carry out wood-pigeon destruction and if it proves successful it will stimulate the formation of other societies in South Buckinghamshire.

The 500 societies now registered in Great Britain represent over 36,000 members and cover an area of over 10 million acres, which is nearly a quarter of the agricultural land. As well as farmers and private estates members include Government Departments, local authorities, the National Coal Board and British Railways, the Forestry Commission and the Nature Conservancy and other public bodies so that every type of landowner is represented. It is not quite two years since the first society was registered at Easter Ross in Scotland in April, 1958 and there are now 388 in England, 76 in Scotland and 36 in Wales.

Cartridges for Shooting Wood-Pigeons

In a written answer to a Question asked by Mr. Clive Blossom, M.P., in the House of Commons on 25th March about the possibility of introducing grants towards the cost of shooting wood-pigeons, Mr. J. B. Godber, M.P., Joint Parliamentary Secretary to the Ministry of Agriculture, Fisheries and Food said:—

"My Rt. Hon. Friend the Secretary of State and I propose to extend the grant to rabbit clearance societies to cover half the cost of cartridges used for shooting wood-pigeons and certain other harmful birds by their own employees and by expert shots, including approved shooting organisations, engaged by them to shoot over members' land when the general cartridge rebate ends on 31st March."

Applications for rebate under the present scheme in respect of cartridges used up to 31st March, 1960 should be made to the Ministry's divisional office by 30th April, 1960.



STANDARDISED DISINFECTANTS

form

Two Associate Companies

Mr. J. N. Hope, Managing Director of Standardised Disinfectants and the new Associated Companies. Photo Courtesy of 'Wood.'

THE Standardised Disinfectants Company Limited has announced the formation of two new associate companies—S.D.C. Pesticides Limited and Preservation Developments Limited. The formation of these new companies represents the latest milestone of a long history of endeavour in the field of manufacture of pest control chemicals as the firm can trace its origin back to the last quarter of the nineteenth century when the great-grandfather of Mr. J. N. Hope, the present Managing Director of the Company, began to manufacture animal medicines.

The Standardised Disinfectants Company Limited was established as such, however, in 1907 and by this time had a well founded business in the manufacture of livestock dips and carbolic disinfectants. Soon after its foundation it added 'Brunolinum' a tar oil type of wood preservative, to its range and this product is still manufactured having stood up to the test of time even under the severest tropical conditions.

As the chemical industry steadily grew in importance so did Standardised Disinfectants increase in both size and scope, and despite two world wars the company's business and activities continued to expand until its products were in world wide use in the fields of agriculture, public health, livestock rearing and timber production. Now, the company's activities have extended into so many fields and reached such proportions that two new associated companies have been formed, each to take over a share of the parent company's work.

By this move the essentially individual character of the original com-

pany will be retained and the two new companies will be able to give customers a better service both technically and commercially. In addition, the names of the two new companies will serve to indicate more precisely their activities for the original name of Standardised Disinfectants Company tended to obscure the fact that an extensive part of the company's activities is the manufacture and marketing of pesticides and wood preservatives.

The Standardised Disinfectants Company will retain its position as the manufacturing unit and in addition to manufacturing the products marketed by S.D.C. Pesticides and Preservation Developments will continue its confidential service of manufacturing products for other companies.

The Standardised Disinfectants Company will continue too its active membership of the Association of British Manufacturers of Agricultural Chemicals, the Industrial Pest Control Association and the Federation of British Industries.

S.D.C. Pesticides Limited

The activities of S.D.C. Pesticides Limited will cover marketing of livestock dips and sprays, agricultural pesticides, insecticides for industrial and public health use and germicides and disinfectants. Under all these heads this new company has plans for expanding sales of established products and for development of new specialities.

For control of external parasites of sheep and cattle 'Zondagam' and 'Zondatox' are well known and are used in countries as far apart as Africa, Latin America, Europe and the Far East. Work on a new livestock spray to overcome the



'Brunolinum Plantarium' is used for the prevention of fungus diseases of rubber tapping panels throughout the major rubber growing areas of the world.



A stack of Offram in Ghana protected from powder-post beetle damage by treatment with Lyxastan.

problem of resistant ticks is at present under way and a new material for ridding domestic dogs of fleas, ticks and other pests is at the marketing stage.

In the agricultural field S.D.C. Pesticides will continue to supply its wide range of insecticides, fungicides and weedkillers to farmers, planters and growers at home and abroad. This range includes 'Stancide' MCPA, CMPP; 'Brunokop' copper-in-oil for control of such diseases as banana leaf spot, phytophthora disease of rubber and late blight of potatoes; and insecticides based on malathion, BHC, DDT, aldrin and dieldrin. S.D.C. Pesticides Limited will take over from the parent company distribution of 'Weedazol T-L' in the United Kingdom. Development work is in progress on a new copper fungicide formulation.

For control of pests of industrial and public health importance S.D.C. Pesticides again provides a wide

range of insecticidal formulations including synergised pyrethrins and products especially developed for use with fogging machines such as Microsol, Swingfog and TIFA.

Progress on the oldest side of the company's business is also reported. The addition of a new germicidal detergent to its established production of carbolic and pine disinfectants will be announced in the near future.

Preservation Developments Limited

Preservation Developments Limited will devote the whole of its energies to the protection of timber from damage and destruction by pests and diseases right from the forest to the final use of timber for the innumerable purposes for which this fine natural material has no substitute.

Its products for the forester include insecticides for control of pests such as pine weevils attacking seedlings, caterpillars defoliating growing trees

and voles damaging young plantations. A new arboricidal formulation for killing unwanted species in the forest and for chemical pruning of trees will be available for field trials later this year.

Preservation Developments Ltd. will of course continue to supply products which have been specially developed for protection of timber during its production stages. These include 'Lyxastan' and 'Brunobrite' for preventing damage to lumber by powder-post beetles and blue stain respectively, and 'Hexastan', with the addition of two new products—'Hexaplus' and 'Protoplus'—for protection of logs from ambrosia beetles, bark beetles and stain.

For preservation of timber in use 'Brunolinum' and 'Brunophen' are well known both in Great Britain and overseas. As well as being used for preservation of new timber, 'Brunophen' is also used on an increasing scale for eradication of woodworm, termites and dry rot from old timbers already suffering from their attack.

Recently at a lecture about BMT Emulsions given to a meeting of the Industrial Pest Control Association, the interest of Preservation Developments Limited in this new type of preservative was made public for the first time. The product referred to in the lecture as BMT Emulsion is in fact a patented American formulation called 'Woodtreat' and Standardised Disinfectants Company Ltd. have manufacturing rights for this country and many parts of the Commonwealth. An article about it—based on the I.P.C.A. lecture—will be published very soon in *Pest Technology*.

Preservation Developments Ltd., is a member of the British Wood Preserving Association.



SDC Livestock Dips are used in Africa and many other tropical and temperate countries

NEWS

New Fungicide for Potato Blight Control

Two British Companies, Pan Britannica Industries Ltd., and Shell Chemical Company Ltd., have carried out a test programme with **American Dithane** in this country. It was found that the U.S. claims were completely confirmed under our conditions, and both companies will be marketing this fungicide for potato blight spraying this season.

The practice and principles of potato blight control have undergone many important changes during the past few years. The need for careful timing of the first spray and for frequent repeat applications under blight conditions have been demonstrated by many research workers. The development of the Dithane fungicides by Rohm & Haas Company, Philadelphia, U.S.A. has provided a group of chemicals, the dithiocarbamates, which are completely safe to the potato crop, even under conditions where a copper spray would result in a serious reduction in yield.

One of the largest fungicide research programmes in the world has been running continuously for the past twenty years at the Rohm & Haas Laboratories and trial grounds. Out of the innumerable chemicals tested, American Dithane has been found to be the most successful potato blight preventive yet discovered. Its remarkable effectiveness under severe blight conditions has impressed the State Experimental Station officials.

American Dithane it is claimed possesses three distinct advantages over the other dithiocarbamates; it is the most persistent on the leaf, the most toxic to blight spores and the most stimulating to the crop. To the farmer this means that the degree of blight control obtained cannot be improved upon by any other fungicide, and that the chance of the characteristic dithiocarbamate boost to yield is greater than with any other product. It is non-toxic, so there is no risk of poisoning to man, game or livestock.

The success of this product depends upon the chemical techniques involved in its manufacture. It is made in the U.S.A., as this is the only area where suitable manufacturing equipment is available at the present time. The basic ingredients are reacted to form a finished product in a uniquely stable and active form. Attempts to produce similar formulations by blending active ingredients with inactive fillers have not proved successful.

The instructions for use include three separate spraying programmes, based upon the frequency of blight attacks in the various potato growing areas of the United Kingdom and Eire. The application rate is $1\frac{1}{2}$ lb. per acre, with a retail price of approximately 12/- per lb. The pack sizes will be three lb., 15 lb., and 50 lb.

M.A.F.F. Warning to Poultry Keepers

Investigations into the origin of fowl pest outbreaks in the present epidemic indicate that many cases are still arising through poultry eating uncooked waste food. Poultry-keepers should pay strict attention to the rule that no person may feed unboiled waste food to poultry or allow fowls to have access to it.

Details of American Wood Preservative given at I.C.P.A. Meeting

In a lecture given to the Industrial Pest Control Association on the 24th March, Mr. D. Boocock, Technical Director of Standardised Disinfectants Co. Ltd., described a new technique originally developed in the United States for eradicating rot, woodworm and termites from infested timber.

The technique depends on a new type of preservative in the form of a thick, bodied, mayonnaise type emulsion which although applied to the surface of the timber nevertheless penetrates deeply and in quantity. This enables preservative to penetrate to the seat of the infestation and to leave behind sufficient preservative to ensure long term protection from reinfestation.

The new preservative is applied to the surface of the timber as bands and equipment for application has been developed. The process is as simple as spraying and one application of the new preservative emulsion is equivalent to at least 20 brush or spray applications.

Laboratory experiments and field trials with the new technique were described in the lecture.

The new preservative is now available in the United Kingdom and Commonwealth for professional evaluation.

(Further details of this product will be given in a future issue of "Pest Technology".)

Celcurised Timber for Crematorium—Prevention of Death Watch Beetle?

Approximately $3\frac{1}{2}$ standards of treated timber were installed in the recently completed Crematorium at Mansfield, Notts. Used in the main for roofing, the timber was supplied and treated with Celcure under vacuum and pressure by Ashworth, Kirk and Co. Ltd., London Road, Nottingham.

Commenting on the choice of 'Celcurised' timber for this project, Mr. E. T. Crowe, B.Sc., A.M.I.C.E., Borough Engineer and Surveyor of Mansfield, said that he considered it essential that the timber in a building of this type should be permanently free from defects during the life of the building.

The general contractors for the Crematorium were C. Millward and Co. Ltd., Kirby in Ashfield.



Construction photo showing Mansfield Crematorium in which 'Celcure Treated' timbers were used.

NEWS—EVENTS

Parallel

NACA of America report that at a meeting of Wisconsin Governor, Gaylord Nelson's, special committee to survey the use of chemicals in agriculture was held in Madison, Wisconsin on Thursday, 25th February. Mr. Lea S. Hitchner, Executive Secretary of the National Agricultural Chemicals Association, complimented the Governor on his forthright step in establishing such an important and distinguished committee.

In addressing the group, Hitchner offered "the full co-operation of the pesticide industry in this urgent and important mission", and expressed the hope that a sound committee recommendation "would overcome the serious harm recently suffered by agriculture and by independent scientific research organisations".

The special committee, the first state-wide group of its kind in the nation, was created by Governor Nelson to develop a decisive and consistent public policy in respect to regulating the use of chemicals as feed supplements, food additives, pesticides, and growth regulators.

Members of the special committee include distinguished scientists, representatives of the medical profession and agricultural experts.

Readers may note that at a recent press conference Mr. Huckle, Chairman of ABMAC, gave a remarkably similar welcome to the Study Group formed by the Ministry of Agriculture. (*Pest Technology*, March 1960, page 129.)

Return of Proceedings on the Animal Health Services in Great Britain, 1959

Outbreaks of foot and mouth disease dropped from 116 in 1958 to 45 in 1959. During the same period outbreaks of fowl pest and anthrax increased considerably.

This information, and a summary of the incidence of animal diseases and related matters for 1959, is given in the Statutory Return of Proceedings under the Diseases of Animals Act, 1950, which is published today by the Ministry of Agriculture, Fisheries and Food and the Department of Agriculture for Scotland. The Return will be followed later by a full report, including the work of the Laboratory Research and Investigation Services.

National Grassland Demonstration

On 8th and 9th June a National Grassland Demonstration will be put on at Mr. Rex Paterson's Hatch Warren Farm, Basingstoke, Hants., and will be opened by Lord Waldegrave, Parliamentary Secretary (Lords) to the Ministry of Agriculture. The Demonstration is a sequel to the National Silage Demonstration which was held on the same farm in May 1958, drawing over 22,000 visitors and is again sponsored by Shell Chemical Company.

The National Grassland Demonstration will be wider in scope and will include field demonstrations of systems of making silage, using various types of forage harvester, hay-making methods, including artificial drying, and fertiliser application with different kinds of distributor. There will, in addition, be an advisory exhibit and an exhibition of static machinery.

The Demonstration will set out to show the value of grass as a crop and will provide practical examples of how yields can be increased, and of conserving grass economically for winter use. A wide range of machinery manufacturers will be taking part.

Seventh Commonwealth Entomological Conference—6th-15th July, 1960

Programme: The Seventh Commonwealth Entomological Conference will be held in London from Wednesday, 6th July, to Friday, 15th July, 1960. The proceedings of the Conference will include a number of Open Meetings, which will be held in the Memorial Hall of the Royal Geographical Society, Exhibition Road, South Kensington, London, S.W.7, and will be open to all entomologists and others who may be interested, whose participation in the discussion will be welcomed.

The open meetings will comprise morning sessions (10-11.15 a.m. and 11.30 a.m.-12.45 p.m.) and afternoon sessions (2.15-3.30 p.m. and 4.0-5.15 p.m.) at each of which a subject of wide general interest will be introduced by one or more invited speakers. The subjects for discussion, and dates, are as follows:—

7th July (morning) Recent developments in insecticides for crop protection. Problems of applying insecticides.

(afternoon) Hazards and precautions associated with the use of pesticides.

8th July (morning) Biological control of insects and weeds. Insect attack in relation to the physical characters and physiological state of the plant.

11th July (morning) Recent investigations on timber-boring beetles. Termite control in afforestation projects and constructional timbers.

12th July (morning) Utilization of pathogenic organisms in the control of insect pests. Recent advances and current trends in the study and control of tsetse flies and trypanosomiasis.

(afternoon) Studies of the dispersal of insects in relation to their control. Research on locusts and their control.

14th July (morning) *Developments in the study of plant viruses and their vectors, and their bearing on control measures.

(afternoon)*The link between research work and its application in the field of plant protection.

*Joint sessions with the Sixth Commonwealth Mycological Conference.

5th British Weed Control Conference

The 5th British Weed Control Conference is being held at Brighton from 7th to 10th November, 1960. The following are the subjects of the main session to be given at this conference:—

The Impact of Herbicides on Crop Husbandry.

Weed Control in Arable Crops.

Improvement of Pastures and Hill Grazing. Bracken Control.

Problems of Advice and Education. The Control of Grass Weeds.

Weed Control in Horticultural Crops. New Herbicides.

Weeds of Waterways.

New Techniques in Agriculture and Horticulture.

Translocation and Fate of Herbicides in Plants.

For all information, including Registration Forms, please apply to the British Weed Control Conference Secretary, F. W. P. Bishop, 52 Bedford Row, London, W.C.1.

PUBLICATIONS RECEIVED

Farm Weeds

Published by Shell Chemical Company Ltd., London, W.1. Price 10/6d.

The full title of this publication is "Farm Weeds—An aid to their recognition", and it has been designed with the object of helping the farmer to recognise the weeds on his land, so that he can determine the most effective method of control and rate of application to be adopted.

Details of control methods can be found in other publications, but for the successful use of chemicals it is necessary to identify the weeds to be treated, if possible, whilst they are still in the early stages. This booklet is one of the most interesting and attractive methods of identification that we have come across.

There are 92 coloured plates, grouped under Arable Weeds, Arable and Grassland Weeds, and Grassland Weeds, taken from the water colours of Doris R. Thompson. The coloured plates are magnificently and attractively reproduced, and they have just the right amount of detail to allow identification of the species. In most cases a sketch of the seedling and younger stages accompanies the water colour of the mature weed, this will allow the recognition of the weeds in the early stages and there is no necessity to stress the importance that this will be for successful weed control.

Each plate is labelled with the most frequent common name and the scientific name. Additional common and local names are also listed, and this, apart from the amusement and entertainment value also provides an additional guide to the recognition of the weed species.

Altogether it is an attractive and informative book.

Agricultural Pesticide Guide Book

Published by the Diamond Alkali Company, New York

We originally obtained this publication to help us with a project that we are attempting to develop, but certain characteristics have led us to believe that it would be of interest to readers. First of all it is free; secondly, it gives details, including full formulations of 44 products of the Diamond Alkali Co. and states

"In addition to the necessarily few products described herein, we can provide more than one hundred other agricultural pesticides If it (another pesticide) is not available from our line, we shall gladly place you in contact with other reputable suppliers". (One or two firms in the U.K. should take careful note); thirdly, a glossary of terms used in the field of agricultural chemicals is given and finally the generic names of common insects and weeds. This could be of value to those of us who read through American publications and sometimes have difficulty in relating the common names used in the U.S. with those in use in this country.

Consequences of Disturbance, The Pest Situation Examined

By Alan Mozely.

Published by H. K. Lewis & Co. Ltd. Price 9s.

The aim of this book is to emphasise the view, held by many scientists in the pest control field, that pests occur as a result of the disturbance of natural ecological systems by human activities such as farming, irrigation schemes, and reclamation of land etc.

The author suggests that we should devote more study to the consequences of disturbance and to the origin and development of pest outbreaks with a view to prevention rather than attempting complete destruction of a pest after an outbreak occurs, for by attempting wholesale destruction an even greater disturbance may be caused which will subsequently create even more pests.

At a first glance it would appear that this is the book for which scientists, who believe in an ecological approach, have been crying out; a book which would provide them with the substance to support their views and allow them to test their opinions in practice rather than just theory.

Unfortunately, the book is too small and with insufficient material and concrete example to give solid support to the author's bold criticisms and statements. In his introduction Alan Mozely states that he

has viewed the situation in a detached way and dealt with the subject briefly with a mind unburdened by administrative pressures etc. As could be expected this has allowed him to reach some clear cut conclusions, but one cannot help feeling that he has been a little too remote and that the casually mentioned examples are inadequate to bring all but those who are already convinced, round to his way of thinking. It is a pity because despite the sketchy presentation a number of valuable points are made which could well form the basis for future progress.

B.P.S. 50. A New and Inexpensive Synergist

Published by W. J. Bush & Company Ltd., Hackney, London, E.8.

W. J. Bush & Co. Ltd. have published a very attractive and well produced booklet or Formulators Manual, giving details of B.P.S. 50, a new pyrethrum synergist, which, they believe, will make a significant contribution to the control of insect pests and to the safeguarding of the world's food supplies. The booklet gives a brief outline of the synergist's history and development, advantages over other synergists, toxicity, technical specification, performance and other information.

It should be of interest to formulators of pyrethrum based insecticides.

Safety of Tanalith Preserved Timber

It is essential that timber treated with wood preservative, does not present a danger to man, livestock or plants. Hickson's Timber Impregnation Co. (G.B.) Limited, Castleford, Yorkshire, have issued a booklet entitled "The Safety of 'Tanalised' Timber" giving brief details of a series of stringent tests carried out on Tanalith C. treated timber, which clearly demonstrates that whilst it is toxic to insects and fungi, there is no hazard to human beings, vertebrates or plants.

One such test is the feeding of bran made from Tanalith C. treated timber to ewe hoggets who suffered no ill effects.

Copies of the booklet may be obtained from the above company.